Monitoring the washing machines market in Europe

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Abstract

French Energy Agency ADEME and WWF Switzerland have set up a project with Topten to track trends on the white goods market in Europe and selected countries. This paper presents the results from the analysis of washing machines sales data, purchased from market research company GfK, in Europe, France and Portugal. The data covers the period 2004 to 2014 and analyses trends in energy efficiency, energy consumption, size and price of washing machines.

Results show that the European market moved faster than energy efficiency policies during the 10-year period observed. For example, already in 2004 more than 80% of the sales were in the official top class A. Before the Energy Label was amended with classes A+, A++ and A+++ in 2010, many of the models available were already marketed as A+, A-10% or A-20% In 2014, A+++ already accounted for 43% of the sales.

Our analysis shows that current Ecodesign and Energy Label policies for washing machines could have been set at a higher level had there been sales data available. Indeed, systematic market monitoring (i.e. the tracking and analysis of sales data) can help set minimum energy performance standards (MEPS) and energy labels that are meaningful and truly steer markets towards more energy-efficient products. The cost of tracking and analysing market data would be more than offset by the increased energy and economic savings associated to better fine-tuned policies.

Background

Minimum energy performance standards (MEPS) and Energy Labels support market transformation towards higher energy efficiency. In order to reach maximum impact, these instruments need to be well designed: MEPS should be stringent enough to create a market 'push' effect. Energy Labels should cover the entire market and offer challenging label classes yet to be reached in order to 'pull' the market. Market analysis from Switzerland has shown that where most of the products are in the Energy Label's top class, innovation almost completely stops for many years (e.g. example dishwashers 2004 – 2011 or ovens 2004 - 2013 in [1]). When the Energy Label is revised to offer new, empty top classes yet to be reached, the market starts to move again (e.g. washing machines in 2008 (when Switzerland introduced the A+ class) and 2012, and dishwashers in 2012, in [1]). Where the Energy Label keeps offering an incentive for further efficiency innovation, the market can constantly improve (e.g. refrigerators and freezers 2004 – 2013 in [1]).

In order to design effective policy measures and revising them before innovation comes to a stop, it is crucial that policy makers have a clear picture of the market. Understanding the development in e.g. sales, size, energy efficiency, energy consumption and price allows policy makers to design MEPS and Energy Labels that are effective for several years. It would also allow evaluating the policies' effectiveness and to revise them in time [2]. As long as an Energy Label covers the entire market and several classes are 'populated' with models, the Label provides a perfect tool for easy market analyses. If sales data is available over a long period, stock and energy consumption models can be derived [2].

Most important economies (e.g. Australia and New Zealand, Brazil, Canada, China, India, the USA) have set-up mandatory product registration systems, resulting in a product database containing specifications of all models marketed [3]. In most cases, these databases are publicly accessible and can be used by the government and stakeholders to support the policy making process. Some countries combine such model information with sales data to track market changes according to sales weigh: Australia additionally purchases sales data on model level from a professional market research company to evaluate and plan its policies, while in New Zealand manufacturers and suppliers are required to provide aggregated sales data to the government annually [3].

Europe is lagging behind as it does not monitor markets of energy-using products (except for cars [3] which indicates that it is possible in Europe), neither with a product registration system on model basis, nor with sales data. Instead, whenever market data is needed for a preparatory study or impact assessment, available data is collected in a time-consuming process by consultants. Usually this data is provided by industry and is neither complete nor up-to-date, and cannot be compared over time and between countries.

As a consequence of this lack of sound market data, product policy measures have been designed not ambitiously enough and energy savings have been missed. Examples are the ban of refrigerators classes B and C in 2010 (only 4% B and 0% C was left on the market in 2009, [11]), or the Energy Labels for washing machines and dishwashers, with the new top class A+++ already populated after a short time.

Objectives

The aim of this paper is to demonstrate the value of systematic market monitoring based on sound sales data for washing machines. It complements other market monitoring reports such as the ones on TVs [5], refrigerators [6], tumble driers [7] and the ones on household appliances from Switzerland [1]. At the same time the data presented here supports the on-going revision of the washing machines Ecodesign and Energy Labelling regulations [8, 9]. With national sales data from France and Portugal for the 2004-2014 period, these countries can learn how national and European energy efficiency policies and campaigns have impacted the appliances markets. This data also provides a solid basis for these countries' input into the Energy Label and Ecodesign revision process, as well as for defining national strategies and campaigns to support the market transformation towards higher energy efficiency.

Washing machines: Regulatory context

The first A to G EU Energy Label for washing machines was introduced in 1995 [10]. The Label was based on a kWh/kg capacity efficiency definition, with 0.19 kWh/kg being the threshold of class A. The energy consumption was defined based on a full load test at 60°C. In 2010, the Energy Label was amended with classes A+ to A+++ [9]. At the same time, the efficiency definition was changed: the Label classes are now based on an Energy Efficiency Index (EEI), the calculation of which is based on annual energy consumption including low power modes and does also consider tests at 40°C and with part load, additionally to the full load 60°C programme. The measurement standard was amended to include these wash cycles, but also additional features were changed (e.g. different detergent and type of soil). As a result, declarations before and after 2011 have to be compared very cautiously. The new Label was compulsory from December 2011, while both Energy Label versions could be used in the period from December 2010.

From the same date, the Ecodesign regulation applied, banning washing machine models not reaching efficiency class A from the market [8]. Other requirements concerned washing efficiency (min. former class A) and maximum water consumption. In December 2013 this MEPS level was lifted to class A+ efficiency. Since then, all washing machine models must offer a 20°C programme.

Before the new Label officially introduced the 'plus'-classes, manufacturers had already marketed their machines that were exceeding class A efficiency as 'A-10%' or 'A-20%'. Based on a voluntary agreement between the Commission and CECED, some manufacturers officially labelled these products as 'A+' before December 2010.

The Ecodesign and Energy Labelling regulations are both being revised at the moment. A preparatory study has been launched which will make suggestions for new Label and Ecodesign requirements[1]. New measures are expected to be implemented in 2016.

Data and Methodology

Thanks to funds from ADEME[2] (Agence de l'Environnement et de la Maîtrise de l'Energie), the Topten study team could purchase sales data of washing machines for the EU, France and Portugal from

[1] http://susproc.jrc.ec.europa.eu/Washing_machines_and_washer_dryers/index.html

GfK, a professional market analysis company present around the world[3]. In Europe, GfK covers around 90% of the refrigerator market, and all 28 Member States.. Sales data plus many product characteristics are obtained from retailers.

GfK provided washing machines sales data including information regarding energy classes and average size, energy and water consumption and price, covering years 2004 to 2014. This data was obtained for France, Portugal, as well as for an aggregation of 21 EU Member States[4]. All information about specifications is according to the declaration on the Energy Label, with a few exceptions that are explained below (A+ and A++ classes and energy and water consumption before 2011). Sales data from Switzerland [1] is published annually and is also used here for comparison reasons.

Similar data was purchased for refrigerators and tumble driers. This is also presented at the EEDAL conference 2015 (papers No. 50 [6] and 58 [7]). Further results about washing machines, refrigerators and tumble driers will also be published on topten.eu [11] in May 2015.

Results and Interpretation

Sales numbers increased from 13.5 million to 15.1 million units from 2004 to 2007 in the EU-21 considered here, then fluctuated around 15 million units per year. In 2014, 15.2 million washing machine units were sold. Sales in France show a similar pattern, stabilizing after 2010. In 2014, 2.38 million units were sold in France. In Portugal sales numbers climbed until 2011, then declined in 2011 and 2012. In 2014 sales were back at the 2009 level, at 284'000 units. (See also [11].)

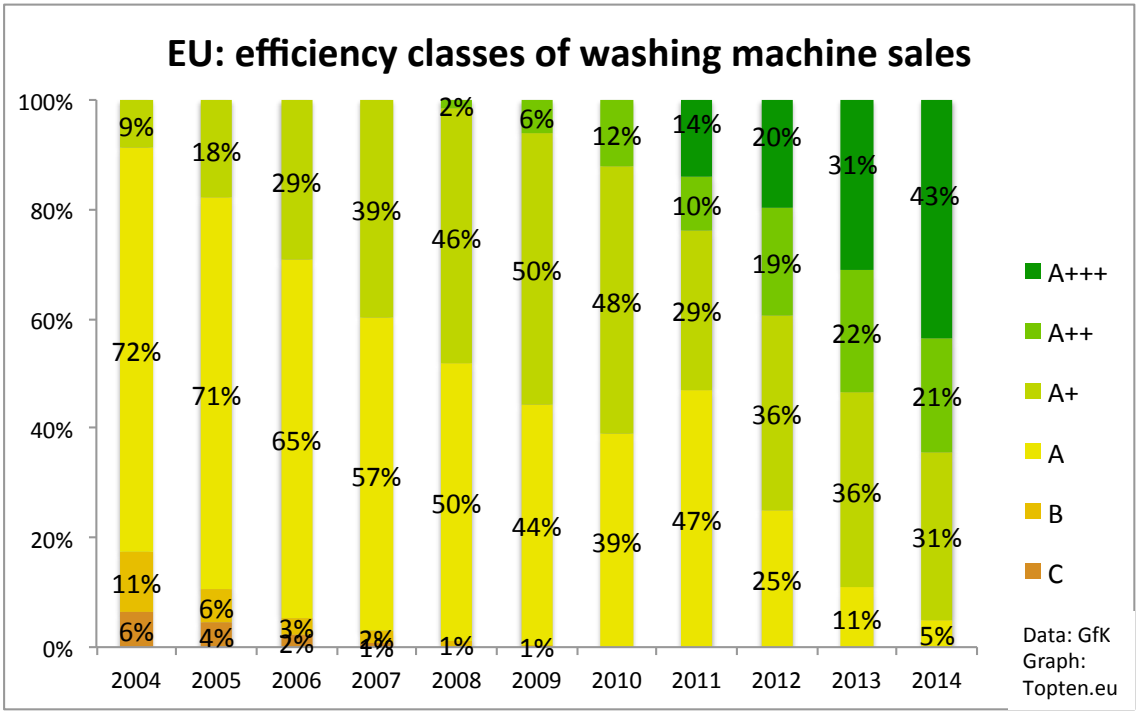

Fig. 1: The most sold efficiency class has improved from A to A+++ in ten years

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[2] www.ademe.fr/

[3] www.gfk.com

[4] EU-28 without Bulgaria, Luxembourg, Estonia, Latvia, Lithuania, Malta and Cyprus.

Classes A+, A++ and A+++ were only 'official' starting in 2011: before 2011, GfK categorized as A+ whatever was declared as 'A-10%' (or A+), and 'A-20%' as A++. Sales share of these classes before 2011 has to be read with caution.

The efficiency development of washing machines happened much faster than expected by the Commission. Already in 2004 the Energy Label was out-dated, with more than 80% of the sales in the official top class A. By 2010, when in December the new Energy Labelling regulation entered into force, 60% of the sales exceeded the class A threshold by 10% or more. There is an increase in class A sales share from 2010 to 2011 – most likely due to the change of Label classification and test measurements that happened at the same time. Still, already 14% of the sales were in the new top class A+++ in 2011, the transition year of the new Label. Tier 1 of the Ecodesign regulation, banning class B and less efficient from December 2011, was obsolete from its entry into force. These classes had been virtually gone from the market several years earlier. Tier 2, banning class A from December 2013, was of minor effect – 11% of the sales still occurred in this class in 2013. In 2014, 43% of the sales across the EU were in the top class A+++. Three years after the new Label became compulsory, close to half of the sold washing machines were in the top class.

Figures 2 and 3 show that popularity of the efficiency classes can vary considerably on national markets. The French market seems to have been less efficient than the EU average since 2005. In 2014, A++ had a higher sales share in France than in Europe (25% compared to 21%), but also A+ (39% vs 31%), and A+++ made up for only 31% of French sales compared to 43% in Europe. In Portugal on the other hand the sales share of A+++ is already close to 50%, while yet in 2004 the sold washing machines were clearly less efficient than in the average of the EU. The high efficiency of the Portuguese washing machines market might be linked to the popularity of large washing machines [11] (large machines tend to reach higher efficiency levels, see fig. 8). Even higher A+++ sales shares can be found on the Swiss graph in [1]: 56% in 2012 and 61% in 2013.

These results imply that classes A+ to A+++ were introduced too late, and that class thresholds were not defined ambitiously and wide enough. Indeed with 13% (A+) and 12% (A++, A+++) the relative efficiency improvements between the classes are smaller than in other Labels (e.g. refrigerators & freezers: A++ 21%, A+++ 33%; TVs: A+ 23%, A++ 30%), and actually only slightly larger than the measurement tolerance of 10% (on energy consumption). The current revision of the Label is overdue. A new Label will not be in place before 2017, until then manufacturers have no possibility to market energy efficient innovations. However, these are already on the market: the best washing machine model is exceeding the A+++ threshold by more than 50% (V-Zug Adora SLQ-WP with integrated heat pump; EEI= 22.8, 8kg. Source: www.topten.eu).

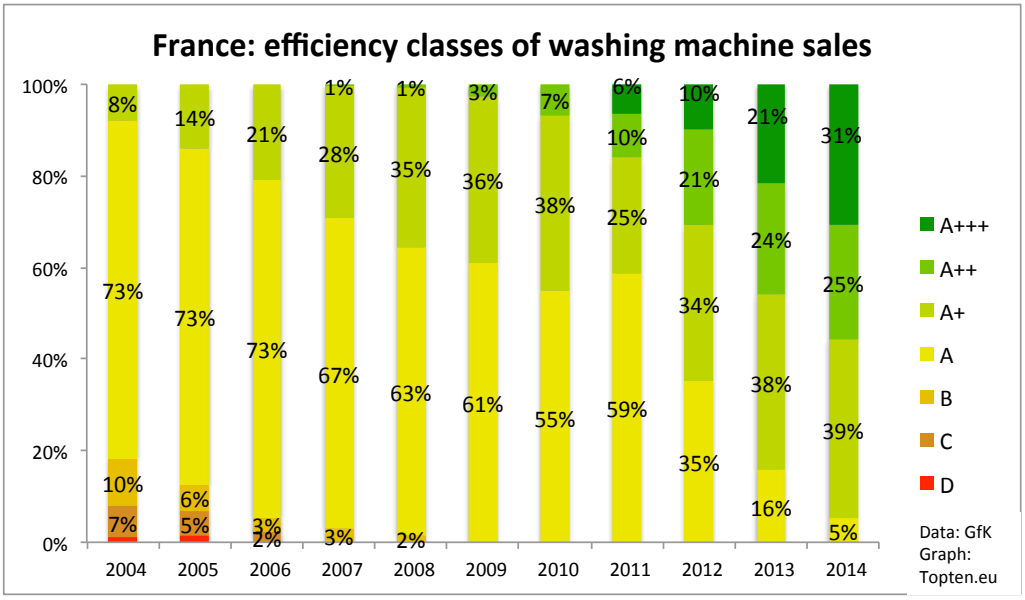

Fig. 2: In France, A+ was the most important class regarding sales in 2014

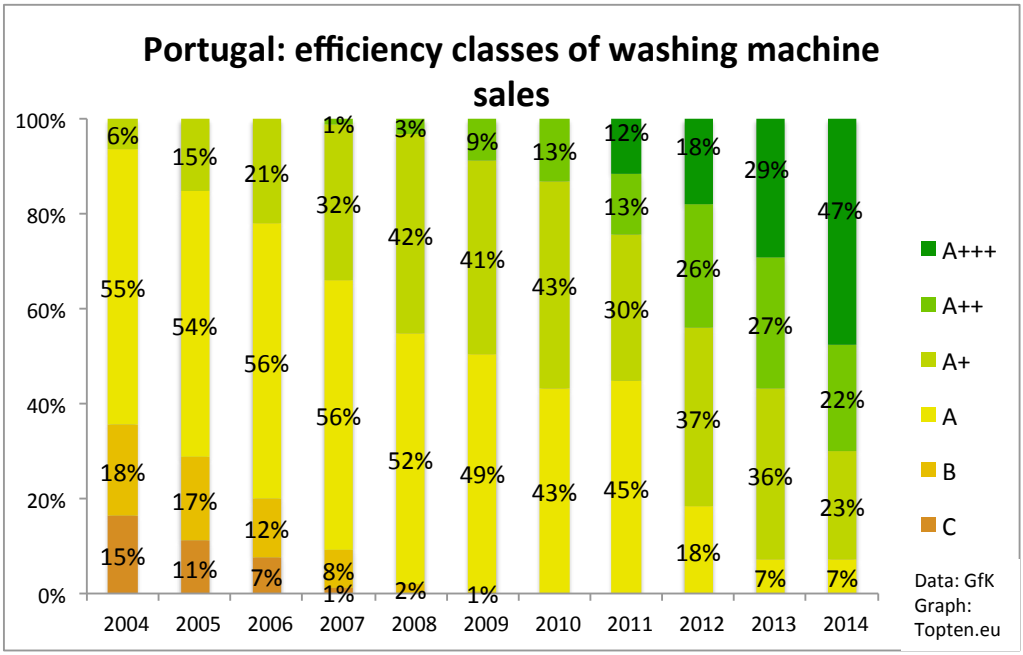

Fig. 3: In Portugal, A+++ already accounted for 47% of the sales in 2014

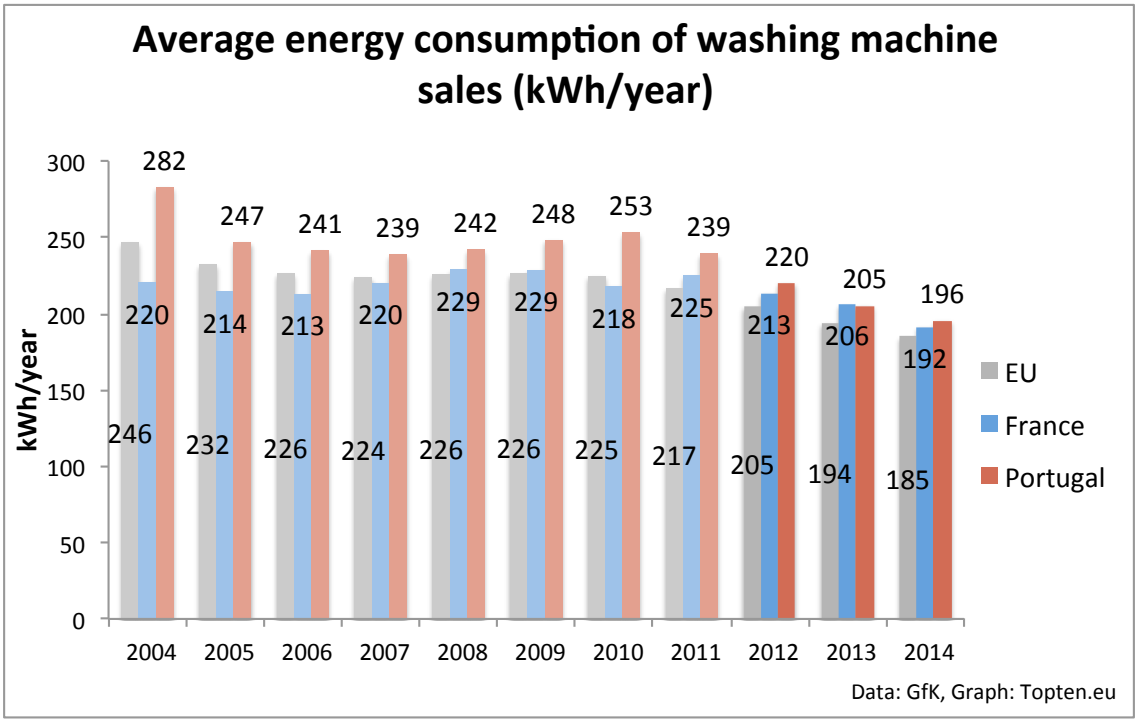

Fig. 4: Average annual energy consumption of sold washing machines started to decline after 2010.

Before 2011/12 the energy consumption was declared in kWh/cycle. These values have been multiplied by 220 by GfK. This is the number of annual cycles assumed for the declaration on the 2010 Energy Label which applied from December 2011. Since the new declaration also includes part load, 40°C cycles and low-power modes consumption, the values are not 100% comparable. While the exact values have to be read with caution, this chart can show trends before 2011 and after.

After a reduction from 2004 - 2006, average annual energy consumption of the sold washing machines remained stable at around 226 kWh/year in the EU. Only in 2011, with the introduction of the new Label, it started to go down. In France and Portugal, average energy consumption even

increased between 2006 and 2009 / 2007 and 2010, respectively, before also decreasing. Since no change in declaration occurred, the trend to larger machines (shown in [11]) must have outweighed increasing efficiency in this period. In 2014, average annual energy consumption of the sold washing machines was 185 kWh per year in the EU-21, 192 kWh/year in France and 196 kWh/year in Portugal.

The reduction in declared and calculated energy consumption between 2004 and 2014 is 25% at EU level, 30% in Portugal and 13% in France. This is comparable with the reduction that happened in refrigerators, as shown in [6]. In the case of refrigerators the energy declaration however remained the same, while for washing machines the real reduction is not so clear because of the changing declarations: the new declaration is no longer only based on full load 60°C washing cycles (three out of seven), but includes also 60°C half load and 40°C half load cycles (each two out of seven), and the measurement standard changed. These changes mean that there is now an incentive for manufacturers to also optimise the energy consumption of the 40°C and part-load pogrammes. However part of the lower energy consumption after 2011 might be due to the inclusion of these less energy consuming programmes – while on the other hand newly also low-power modes were included (which can represent up to 12 kWh/year [12]). Own calculations, based on the values recommended by the Commission in 2009 for transitioning between the old and new methods [13] and values published on www.topten.eu[5], imply that around 10% of the reduction in energy consumption might have occurred due to different methods. Still, the average declared energy consumption has continuously been reduced since 2011 - despite a strong trend to larger washing machines (fig. 5). Clearly the tested programmes have indeed been optimized regarding energy efficiency.

It is surprising that in Portugal, where most energy efficient washing machines were sold, the average energy consumption is highest. An explanation can be found in the comparable large capacities that Portuguese buy: while across the EU in 2014 still 41% were 6kg and smaller machines (fig. 5), in Portugal only 20% were small (we use the term‘small’ here for convenience reasons, even though 6 or even 5kg machines were the standard ten years ago), 44% were declared as 7kg machines and 28% as 8kg |11]. This situation shows that larger capacity can cancel or even outweight the savings of better-rated machines – at least for a usage according to the Energy Label.

Effective energy consumption of course depends on the usage of the machines. According to a product expert[6], Portuguese use their wasing machine often (more often than dishwashers) and wash rather small loads. According to the expert, Portuguese consumers do not choose large washing machines because they wash large loads, but because nearly no small machines are offered on the market.

[5] The Commission recommended to assume that the energy consumption of a 60°C half load programme is 0.8 times that of a 60°C full load, and the consumption of a 40°C half load 0.64 that of a 60°C full load programme. Furthermore, 12.5 kWh per year were added for the Standby and Off modes. Data from Topten.eu shows that these assumption are still fairly correct (in September 2014, just after the product lists were updated), but variations are large. The consumption by low power modes has not been compared.

[6] Oral information from Laura Carvalho, Quercus / Topten Portugal (www.topten.pt/) in March 2015

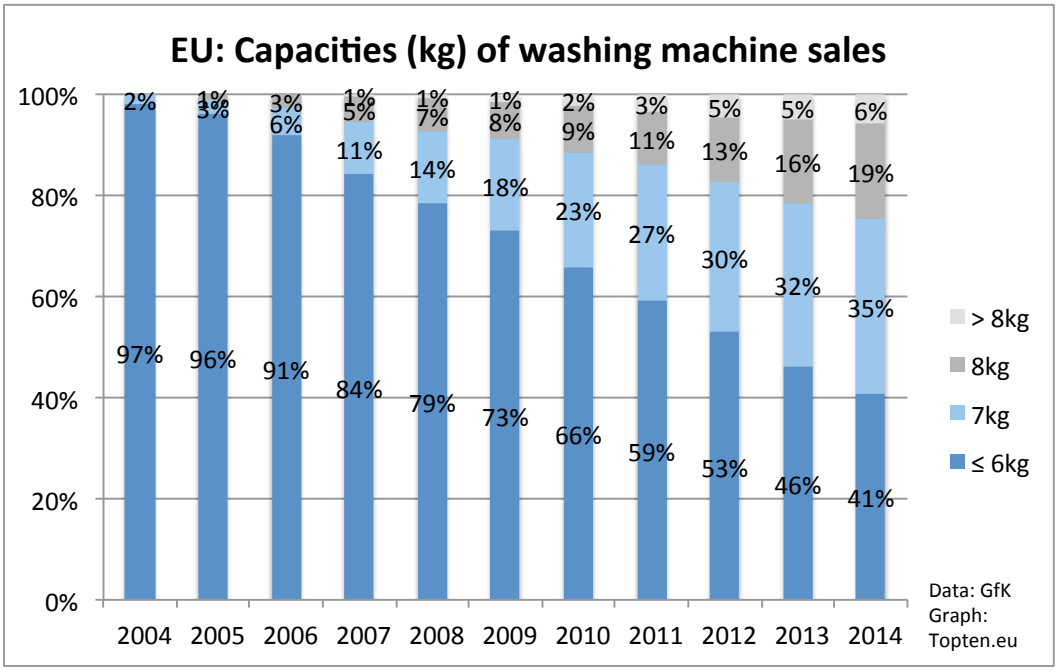

Fig. 5: There is a strong trend to larger capacities.

Ten years ago nearly all washing machines were for 6 kg of laundry and less, then the strong trend to larger capacities started. In 2014, more than half of all washing machines sold were designed for washing 7 kg laundry and more. It seems that the trend to large washing machines is rather coming from the changed market offer than from consumer demand. It is questionable if washing habits are changing so suddenly to washing larger loads, especially since the average household size is declining (Eurostat). The Energy Label might be at least partly responsible, since it was easier for large machines to reach good efficiency levels. With the new EEI system and the inclusion of part load washing the effect is less direct than it was in the old Label, but the trend has been continuing. Even if they are A+++, oversized washing machines do not contribute to energy saving. Instead, energy and water will be wasted if most wash cycles run with low part loads (e.g. 2-3kg in 8kg machines).

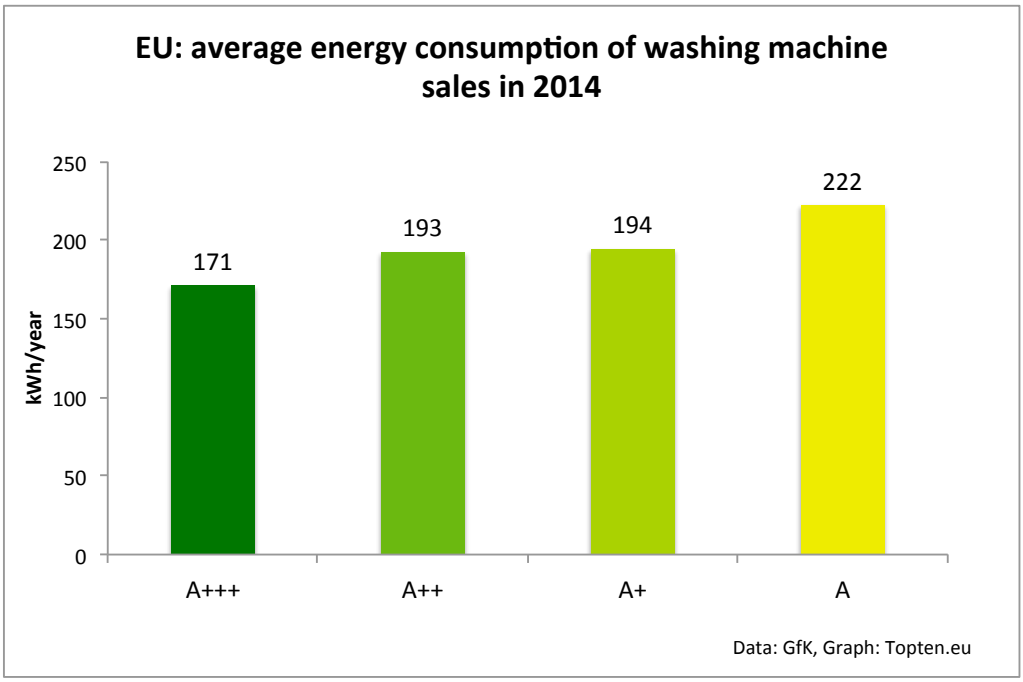

Fig. 7: Energy consumption differences between efficiency classes are not so large

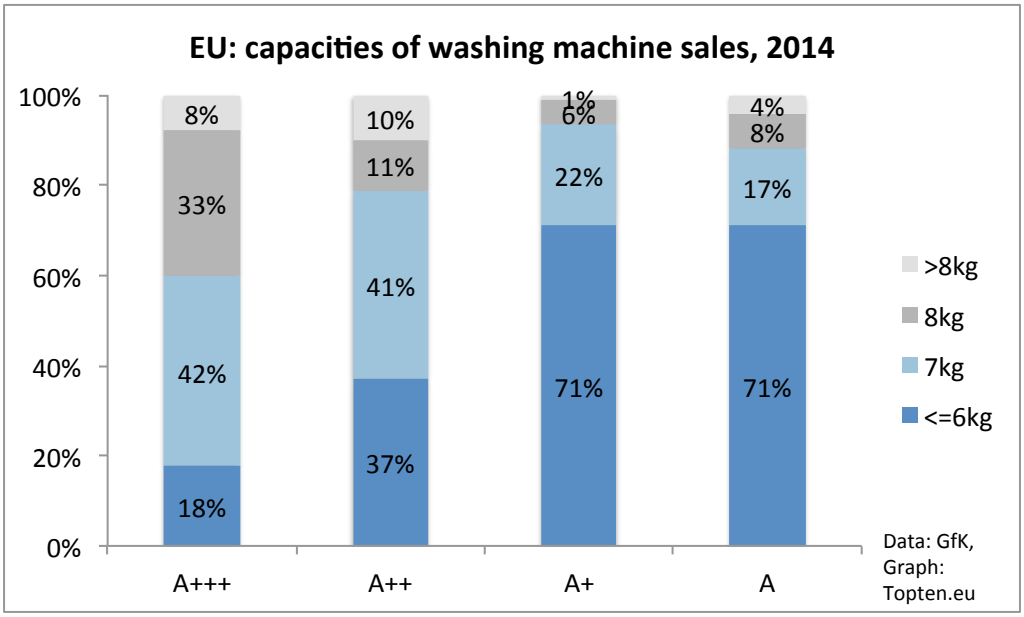

Fig. 8: Efficient washing machines are large washing machines

Figures 7 and 8 show energy consumption and size differences between efficiency classes. The reduction in energy consumption between the classes is small to nearly non-existent: the average declared energy consumption of all class A+ and A++ washing machines that were sold in 2014 is virtually the same. There are two reasons for the small differences in energy consumption: First,.washing machines sold in the two top efficiency classes have clearly larger capacities than A+ and A models. Efficient washing machines are larger washing machines – the larger load leads to a relative increase in consumption and weakens the effect of higher efficiency. Second: the efficiency steps between the classes are not large. Our calculations show that a difference of four classes (A to A+++) results in a reduction in energy consumption of 23% only. In the case of refrigerators for example, this reduction is achieved with a step of one single class [6].

While these declared energy consumption values are valuable for comparing models with each other, they however bear little evidence of how much energy washing machines are consuming in reality, when users choose programmes different from the test programmes or fill their 8-kg-machines with 2kg only. Larger washing machines certainly bear the risk of wasting more energy than smaller ones.

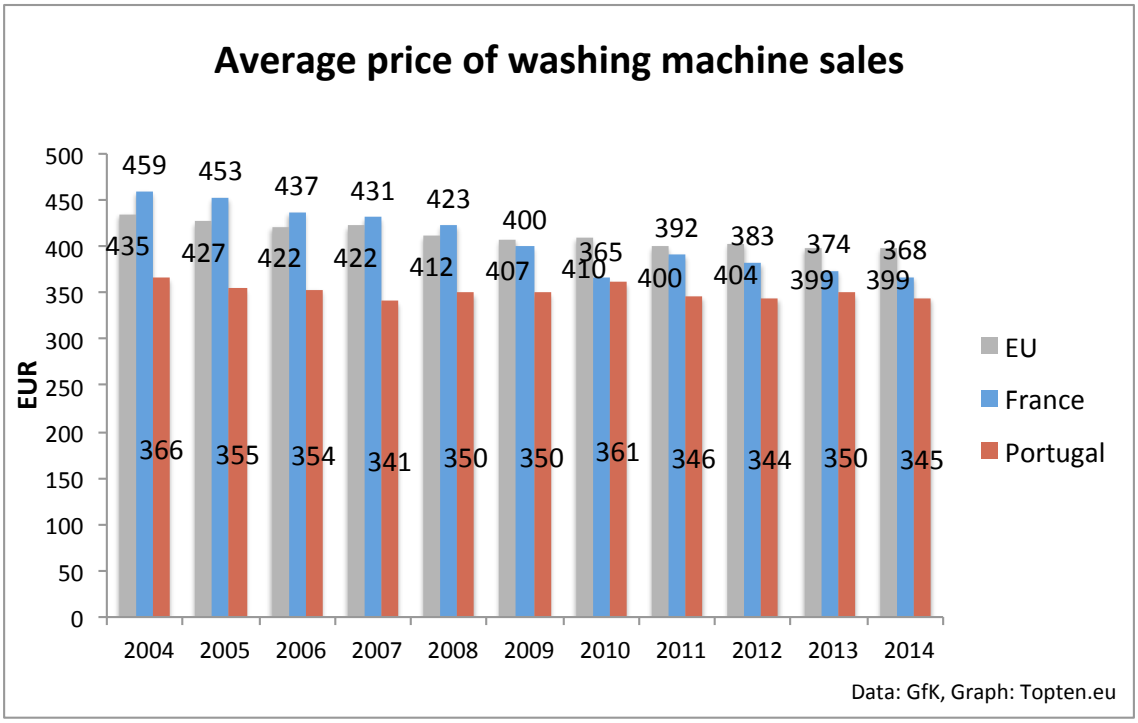

Fig. 6: Average real prices have declined, despite higher efficiency and larger capacities.

Across the EU-21, average washing machine real prices have declined by 8% from 2004 to 2014 – despite higher efficiency and larger capacities. In France, the reduction in price was even 20%. In Portugal, where the sold washing machines are larger and more efficient, average prices are lower. The price reduction in ten years was 6% in Portugal. Since 2009, French and Portuguese average prices have been increasingly below the EU average. In 2014, A+++ washing machines cost on average 69% more than A+ washing machines in the EU [11]. Since more efficient washing machines are also larger, this price premium is linked to both energy efficiency and size.

Conclusions

The first glance on figures 1 to 3 shows a successful efficiency improvement on the washing machines market between 2004 and 2014. Some considerations and more detailed analysis however show some problems and raise questions on the real success.

- Between 2004 and 2011, manufacturers had no official possibility to market energy efficient innovations. More than half of the washing machines that were sold in 2009 and 2010 were declared as exceeding the top class A by more than 10%.

- Soon the situation will be the same again: already 43% of the sales were in the top class A+++. Information on www.topten.eu shows that in July 2015, the best washing machine model is exceeding the A+++ threshold by more than 50% (V-Zug Adora SLQ-WP with integrated heat pump. EEI= 22.8).

- The 2010 Energy Label has not stopped the trend to larger washing machines. It still seems to offer an incentive for higher capacities, because larger washing machines can still reach good efficiency levels easier than smaller machines. Combined with small efficiency steps between the classes, this results in doubtful energy savings. This is underlined by the fact that the average energy consumption of the sales in Portugal is higher than in France and the EU, even though Portuguese buy more energy efficient washing machines.

Recommendations: Energy Label revision

The current Energy Label has been implemented too late, and the added classes were not ambitious enough. The ongoing revision must avoid this mistake and define a Label with classes that can encourage the development of more energy-efficient washing machines for several years into the

future. In addition, the Label should be re-scaled to the original A-G scheme, which has shown to be most effective in many studies (e.g. [14|), with the top classes reserved for future innovations. Furthermore the efficiency classes, the most important communicative aspect of the Energy Label, must also be the most important aspect defining the energy consumption – more important than capacity. The new energy label for washing machines should stop encouraging larger machines'. Both can be achieved with a progressive reference line (SAEc): the requirements for reaching a specific efficiency level should be higher for larger machines. At the same time it is recommended to include an 'average' or even 'small' load test cycle (3kg or less) into the EEI and energy consumption calculation (see also [15]).

Systematic market monitoring

Through systematic market monitoring of energy-using products, Europe has the opportunity to set new MEPS and labels that truly encourage a trend towards more energy-efficient products. Such a monitoring system would be inexpensive to implement when compared to the vast energy and economic savings that it will enable. It is hard to understand that Europe renounces on the huge benefits of market monitoring: professional market research companies have the data and it does not cost a lot. Analyzing the market on a systematic basis with sound data would be more cost-effective than today's rather chaotic practice. Even if market monitoring on the longer term was based on a mandatory product registration system and on model data, monitoring based on sales data can start now.

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